

WHAT IS CLAIMED IS:

1. A method of detecting three-dimensional information, comprising steps of:

forming an image of an object illuminated by illumination light having given intensity as an optical image; and

detecting a distance between individual points of the object on the basis of an image obtained by acquisition of the optical image with a given image pick-up gain, wherein either the given intensity or the image pick-up gain is changed with time, and the distance between respective points of the object can be detected at a speed at which three-dimensional information can be followed real time within a period of time corresponding to the frame of a video signal.

2. The method of detecting three-dimensional information as defined in claim 1, wherein first and second optical images of the object illuminated by first and second illumination light, either of which includes time-varying intensity, are formed; first and second images are obtained by acquiring the first and second optical images with a single image pick-up gain over a given period of time; and the distance between respective points of the object can be detected on the basis of the first and second images at a speed at which the three-dimensional information can be followed real time within a period of time corresponding to the frame of a video signal.

3. The method of detecting three-dimensional information as defined in claim 2, wherein the intensity of the first illumination light is increased or decreased with time, and the second illumination light has a given intensity.

4. The method of detecting three-dimensional information as defined in claim 2, wherein the intensity of the first illumination light is increased with time, and the second illumination light is decreased with time.

5. The method of detecting three-dimensional information as defined in claim 1, wherein there are formed first and second optical images of the object illuminated by first and second illumination light which illuminate with single intensity over a predetermined period of time; and the distance between respective points of the object is detected from the first and second images which are produced by acquisition of the first and second optical images with the first and second image pick-up gains, either of which is changed with time, at a speed at which the three-dimensional information can be followed real time within a period of time corresponding to the frame of a video signal.

6. The method of detecting three-dimensional information as defined in claim 5, wherein the first image pick-up gain is increased or decreased with time, and the second image pick-up gain is uniform.

7. The method of detecting three-dimensional information as defined in claim 5, wherein the first image pick-up gain is increased with time, and the second image pick-up gain is decreased with time.

8. The method of detecting three-dimensional information as defined in any one of claims 1 through 7, wherein the image is acquired a plurality of times within a period of time corresponding to the frame of a video signal.

9. A device for detecting three-dimensional information pertaining to an object comprising:

a projection section capable of projecting illumination light having given intensity on the object;

an image pick-up section capable of acquiring an image of the object with a given image pick-up gain; and

a signal processing section which calculates the distance between respective points of the object on the basis of intensity level information included in a video signal output from the image pick-up section, wherein either the given intensity or the image pick-up gain is changed with time, and the distance between respective points of the object can be detected at a speed at which the three-dimensional information can be followed real time within a period of time corresponding to the frame of a video signal.

10. The device for detecting three-dimensional information as defined in claim 9, wherein the projection section is equipped with a light-emitting element whose light can be modulated in accordance with an electric signal.

11. The device for detecting three-dimensional information as defined in claim 9, wherein the projection section comprises a light-emitting element, and a modulator capable of modulating light emitted from the light-emitting element.

12. The device for detecting three-dimensional information as defined in claim 9, wherein the image pick-up section comprises:

imaging means for producing an optical image upon receipt of light reflected from the object;

an image pick-up element which captures the optical image and outputs a video signal; and

an image intensifier with gating operation which is disposed between the imaging means and the image pick-up element and which can control an image pick-up gain.

13. The device for detecting three-dimensional information as defined in claim 9, wherein the signal processing section calculates the distance between respective points of the object according to the method defined in any one of claims 2 through 8.